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Challenging cloud-resolving simulations of Arctic mixed-phase clouds with airborne remote sensing observations

Vera Schemann, Theresa Kiszler, and Mario Mech

University of Cologne, Institute for Geophysics and Meteorology, Köln, Germany (schemann@meteo.uni-koeln.de)

For further process understanding and investigation, it is important to challenge the representation of ice and mixed-phase clouds in high-resolution simulations by detailed observations. These observations can be provided by remote sensing instrumentations on the ground, aircrafts or satellites as well as additional in-situ measurements of clouds. As these observations are always limited in dimension - either space, time or resolution, the analysis is not trivial and especially point-to-point comparisons in time are challenging if not impossible.

In 2017 the ACLLOUD campaign took place in the Arctic - close to Svalbard. During the 5 weeks in early summer, Arctic mixed-phase clouds have been observed by two aircrafts - one for mainly remote sensing and one for in-situ measurements. We will show a statistical comparison of the remote sensing measurements with cloud-resolving simulations with 600m resolution. The simulations have been performed with the large-eddy version of the ICON model (ICON-LEM), the Seifert and Beheng two-moment microphysics and lateral boundary conditions based on operational global forecasts. Additionally, we will touch the question of representativity of these aircraft measurements. How representative are crosssections for the specific region, how should we compare those crosssections with the model and how much does the flight-day selection influence our results.